

CANADA

# Why flash floods like in Texas are expected to happen more often — and in more places

While flash floods are not uncommon, they're getting more destructive and deadly — and more widespread.

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A damaged car sits near the Guadalupe River on Sunday in Hunt, Texas, after heavy rains caused deadly flash floods.

Jim Vondruska Getty Images



By Marco Chown Oved Climate Change Reporter

In the anthology of extreme weather exacerbated by climate change, few events are more horrific than flash floods.

A hard rain is funnelled by steep slopes, transforming brooks into creeks, creeks into rivers and rivers into raging torrents that rip trees out by their roots and tear houses from their foundations creating a moving debris field of death.

In Texas, this geographic multiplier effect turned 20 inches of rain into a 26-foot rise in the Guadalupe River in only 45 minutes.

It's no wonder that flash flooding has been called a "rain bomb."

Floodwaters forced people to escape their homes by swimming out windows, only to find themselves caught up in a maelstrom, dodging floating cars and telephone poles. More than 80 people have been killed, including 28 children at a summer camp, and officials warn the death toll could rise as more missing are found.

### **Are flash floods getting worse?**

While flash floods are not uncommon and have long occurred around the world, they're getting more destructive and deadly due to a confluence of three factors: climate change, population growth and land use, according to Slobodan Simonovic, professor of civil engineering at Western University and director of engineering studies at the university's Institute for Catastrophic Loss Reduction.

"The physics is very clear: with global warming, you have higher temperatures, you are storing much more moisture in the air, and that moisture comes back in the form of very intensive storms," he said. "Combine that with the geography of the region that makes things worse: Steep hills, rocky land, no absorption at all. So the rain flows very fast into the creeks and rivers, raising the water levels.

"Add land use and populations living in high-risk areas and you don't just have a flooding event, you have a disaster," he said.

### **Are flash floods getting more frequent?**

Due to its steep valleys and limestone bedrock that prevents the soil from absorbing the rain, Hill Country in Texas has a long history of deadly flash floods, they have also recently hit areas less habituated to the risk, such as Germany and Austria.

"If you look down the road and follow these big events, it is becoming very clear that we are seeing them much more often. And they're becoming much more serious," Simonovic added.

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In Canada, parts of the Rocky Mountains are at risk of flash flooding, though Simonovic stressed few people live in the affected areas.

### **Can you prepare for a flash flood?**

Unlike regular flooding, which can be mitigated with sump pumps, or wildfires where you can help protect your house by installing a metal roof or

clearing back the bush, it's basically impossible to prepare for a flash flood — all you can do is flee.

As a result the best preparation is good forecasting and sending out early warning.

“You gain time by providing information early so that you can evacuate people from the potential areas that will be affected,” Simonovic said.

But accurate prediction and adequate warning are very complex problems, said Reza Najafi, a professor of civil engineering and head of the Hydroclimate Extremes and Climate Change Lab at Western University.

“While improvements in forecasting have helped, we often get the magnitudes wrong and what may have been predicted as a heavy rain becomes a torrential storm,” he said.

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### ‘A complex problem — and a global one’

While flood warnings get issued, they often don't get to the most affected people, or if they do, those people often ignore them.

“If you live in Texas where flooding happens so often, you may underestimate the coming weather, thinking you live far enough away from the river to be safe,” said Najafi. “Conversely, in areas that have not experienced flooding events — like in Dubai, which had a major flood last year even though it's in a desert — people don't know what to do.”

“This is a complex problem — and a global one,” he added.

Climate change is not only increasing the frequency of extreme precipitation events, it's also pushing them into areas where they've never happened before, he said.

Areas where impermeable concrete and pavement mimic rocky soil — like cities — are at much higher risk for flash flooding in the future.



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